How Apple can be fixed

It's time to join the PC world and make the Mac the universe's most compatible computer.

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Apple has long capitalized on its legendary status as the original headquarters of innovative design in computers. But in its current time of troubles, company executives may be discovering that their best bet is to think similar. It's time to give up on the Mac-only microprocessor and make Mac hardware Windows compatible.

High-tech companies as a whole have suffered grievously in 2000 -- one glance at the NASDAQ's bungee jump since March demonstrates that -- but Apple's recent revenue and stock troubles are as specific to its products as they are general to its industry.

The theoretically tremendous performance advantages of the Mac's PowerPC processors haven't really panned out. Most objective tests show that today's best PC processors -- such as AMD's Athlon chip, running at 1 gigahertz or faster -- easily outrun today's 500-megahertz PowerPC G4.

There's some reason to believe Apple is aware of this problem and is acknowledging it by way of its current designs. Why, for instance, did Apple CEO Steve Jobs authorize, develop and introduce a dual-processor G4 Macintosh without even raising prices? Many observers consider that move an acknowledgment that PowerPC performance has been stagnant compared with blistering competitors, such as the Athlon. Unfortunately, the current Mac OS largely ignores the possible benefits of running two processors, so the performance advantage is completely unnoticeable to the average user.

But performance isn't the only thing Mac designers should be thinking of. Despite the charm of the Mac's smoothly integrated hardware-software combination and the Mac OS's many subtle conveniences, businesses and consumers ultimately want the large software library available for the PC.

Consumers want games, but games usually come out a year later for the Mac than for the PC -- if they come out at all. Business applications are increasingly Windows only. Microsoft Office for the Mac is a special case, a suite of products so essential to the Mac's ongoing survival that many doubt Apple could survive if Microsoft decided to kill it.

Dire times call for bold solutions. It may seem unimaginable, but consider what would happen if Apple were to drop the PowerPC and build a Macintosh around an Athlon chip.

Apple's computers would for the first time be able to run Windows applications -- even Windows 2000 -- at native speeds, ending forever the argument that the Mac is

incompatible with the rest of the world. Suddenly, the Mac would be a serious solution for everyone, since it would be the most universally compatible computer on the planet.

Given that the next iteration of the Macintosh operating system, OS X, is based on Unix and can also compile and run Unix applications, the upshot is that virtually all available software would run in native mode on an Athlon-powered Macintosh.

The strategic advantages don't end there. Microsoft's looming ability (however unlikely) to kill the Mac with one blow -- by eliminating Microsoft Office -- would end instantly, since the Mac could run Office for Windows as well as any other PC on the block does, and it's inconceivable Microsoft would ever kill off Office for Windows.

Additionally, parts would be available in greater supply and at lower prices than is the case for Apple today, and Apple could pass those savings on to consumers, thus providing a counter to the second common objection to the Mac -- that it's still too expensive.

What operating system would this Athlon-based Macintosh run out of the box? Apple's, naturally -- OS X. There would be some difficulties adapting OS X to the Athlon, but such a task is not unthinkable -- after all, OS X is a digital child of an older, cross-platform OS called NeXTStep that was available for PCs.

If we're to conclude anything about OS X from the beta version released earlier this summer, it's that Apple is committed to reestablishing its leadership in interface design. OS X will surely include significant advantages over Windows operating systems when a release version ships in 2001.

By marrying Mac's OS X to Athlon hardware Apple would retain compelling innovation that would distinguish it from all other PC-compatible competitors, while also providing lower prices, greater performance and better compatibility than is the case with its current computers.

So far, so good. But there are certainly obstacles along the way to this Utopian computer.

Apple refused to comment officially for this story. But Jon Morton, Macintosh workstation specialist at the National Geographic Society in Washington, points out a couple of potential problems: software compatibility and the possible reaction of developers facing such a switch.

"A complete change of processors means a *lot* of rewrites ... The same developers who balked at writing in Objective-C when Apple first bought NeXT aren't going to be eager to start coding for a whole new processor instruction set."

It's true that low-level code that directly accesses hardware would break -- some drivers, for instance, would probably have to be rewritten. But most of the application code for Macs is written more abstractly than that, without concern for hardware issues, and could be recompiled for an Athlon-based Mac without much effort. If, that is, Apple engineers didn't change the APIs (application programming interfaces -- the underlying set of software accessed by applications to function within the context of the greater operating system).

And they could certainly live up to that goal; indeed, it was exactly this strategy that was the cornerstone of Jobs' former OpenSTEP software development product. The idea of a single unified API set, allowing program code to recompile for multiple processors with little or no work on the part of the developer, is nothing new to Apple's software engineering team.

Morton's second objection is somewhat more complex. "What about all the legacy Mac software -- will there be yet another emulation layer to get all those old programs running on an x86 chip?" he asks.

This is a daunting problem indeed. Consumers may be expecting to have to buy new OS X software next year, but they're also expecting to be able to run the old stuff at native speeds. With an Athlon-based Mac, that would be impossible.

This, however, is an obstacle Apple has come to grips with before. The shift Apple made

in 1994 from the Motorola 68000 family of processors to the PowerPC was a sea change involving total incompatibility with all previous Mac software. Yet Apple, despite this considerable technological challenge, made the transition with a seamless, transparent low-level emulator, and the new chips, because of their superior performance, ran the older software in emulation acceptably.

The result was that despite Apple's radical leap, its customers were uniformly satisfied.

The same sort of processor emulation would be possible for Apple again, allowing older PowerPC code to run on an Athlon-based Mac yet not interfere with the new software written for the new chip and OS X.

Sure, Apple customers would have to buy that new software to run on the new computers. But they're going to have to do that next year whether Apple switches processors or not.

OS X will, when it ships, still run traditional Mac OS applications, but those applications won't be able to take advantage of the multitasking or stability of the new operating system at all. This won't be acceptable to Mac users for long; they'll certainly crave the stability and performance promised by OS X, and to get it, they'll have to buy new software.

The situation is roughly analogous to the advent of the PowerMac six years ago -- you could run the old stuff, but if you really wanted to play, you had to pay.

Asking Mac users to pay for new OS X applications that happen to be compiled for an Athlon processor instead of a PowerPC processor isn't much of a leap; the price tag probably wouldn't even change significantly.

However, there's also the gut reaction of the Mac faithful to think of. Mac users have long considered Intel an evil second only to Microsoft, and chips like AMD's Athlon, which are compatible with Intel chip design, are guilty by association. To some, the underlying architecture of both Intel's Pentium chips and AMD's Athlons is obsolete. Theoretically, the

PowerPC RISC architecture should be much faster.

But the unrealized theoretical hope of better performance, at a time when Motorola and IBM obviously cannot keep up with AMD and Intel, isn't much of a selling point, not compared with the potential reality of the world's most compatible computer -- a computer running every major piece of software available at native speed. This is a concept that will never see fruition with the PowerPC running the show.

Putting technical issues to one side, though, there's yet another catch -- and it might be the biggest catch of all.

I had lunch with an Apple employee recently. He's a technically savvy guy who has been with the company for many years, and he knows what's possible and what's not. He nodded at all the technological arguments I made, and he agreed with most of the benefits I cited for an Athlon-based Macintosh.

But when I asked him if he thought the product could ever ship, he just laughed.

"Jobs would never go for it," he said.

"Why?"

"Because it would be inelegant."

"Not at all," I said. "You run Windows in a window, just like Virtual PC on the Mac now, but as fast as a real PC. From the Mac side, the whole Windows partition -- Windows and all its applications -- would be a giant file. You could just throw it away if you wanted to get rid of it. You could just drag it to a server if you wanted to back it up. What could be more elegant than that?"

"Not inelegant technically," he said. "Inelegant visually. To Steve, I mean. Steve would want all the Windows apps to run as seamlessly as Mac apps. He would want them all to look like Mac apps. He would never tolerate the idea of Windows running in a window --

he'd want Windows on a Mac to be better than Windows on a PC. Look, he'd want users to be able to buy Windows apps that were never meant to run under OS X, install them and have them look and feel exactly like true OS X apps."

"But that'd be next to impossible technically," I objected.

"Steve isn't worried about what's possible or impossible technically," he pointed out. "He's only worried about what he wants, and one of the things he absolutely requires is products that look great. 'Do you think the iMac would sell half as well if it were half-beige?' -- that's what Steve would say."

An interesting point.

"What would happen to such a project if some rogue Apple engineers developed it and showed it to him?" I asked.

"It'd just get Steved."

And that, as any Apple employee knows, would mean that the concept of Athlon-based Mac-x86 compatibility would be eighty-sixed.

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